

**AMENDMENTS TO THE CLAIMS:**

This listing of claims will replace prior versions and listings of claims in the application.

**Listing of claims:**

Claims 1, 5-9, 13-15 have been amended, and claims 2-4 and 10-12 have been withdrawn as follows: Underlines indicate insertions and ~~strikeouts~~ indicate deletions.

1. (Currently amended) A method for the extraction of linear features from digital imagery, comprising the steps of:

providing a digital image;

providing a multi-layer database;

initializing a parameter domain;

successively applying the a Radon transform on each position in the parameter domain;

for each position in the parameter domain:

finding the coordinates of the a nearest pixel in the digital image;

determining the a numerical value of the found nearest pixel;

and

populating the layers of the provided multi-layer database in accordance with the determined numerical value of the found nearest pixel;

analysing the data of the multi-layer database for linear features; and

generating an output image by restoring the lines detected linear features in the analysing step.

wherein said step of providing a multi-layer database includes providing a multi-layer database having at least five layers: a first layer used to contain coordinates of zero value pixels; a second layer used to contain coordinates of non-zero value pixels; a third layer used to contain values of the non-zero value pixels; a

fourth layer used to contain the values of the zero value pixels, and a fifth layer used to contain an accumulation of the non-zero pixel values.

2. (Withdrawn) A method for the extraction of linear features as recited in claim 1, wherein the multi-layer database providing step includes providing a multi-layer database having at least three layers; a first layer used to contain the coordinates of the zero value pixels; a second layer used to contain the coordinates of the non-zero value pixels and a third layer used to contain the values of the non-zero value pixels.

3. (Withdrawn) A method for the extraction of linear features as recited in claim 2, wherein, in said populating step:

the coordinates of the found pixel are stored in the first layer when the numerical value of the pixel is found to be zero;

the coordinates of the found pixel are stored in the second layer when the numerical value of the pixel is found to be non-zero;

the numerical value of the non-zero pixels is stored in the third layer.

4. (Withdrawn) A method for the extraction of linear features as recited in claim 1, wherein the multi-layer database providing step includes providing a multi-layer database having at least five layers; a first layer used to contain the coordinates of the zero value pixels; a second layer used to contain the coordinates of the non-zero value pixels; a third layer used to contain the values of the non-zero value pixels; a fourth layer used to contain the values of the zero value pixels and a fifth layer used to contain the accumulation of the non-zero pixel values.

5. (Currently amended) A The method for the extraction of linear features as recited in claim 4 1, wherein, in said step of populating step the layers of the multi-layer database comprises:

storing the coordinates of the found nearest pixel are stored in the first layer when the numerical value of the nearest pixel is found to be below a predetermined threshold;

storing the coordinates of the found nearest pixel are stored in the second layer when the numerical value of the nearest pixel is found to be above the predetermined threshold;

storing the a numerical value of the pixels having a value which is above the predetermined threshold is stored in the third layer;

storing the a numerical value of the pixels having a value which is below the predetermined threshold is stored in the fourth layer; and

storing the an accumulation of the numerical value of the pixels that have a numerical value which is above the predetermined threshold is stored in the fifth layer.

6. (Currently amended) A The method for the extraction of linear features as recited in claim 1, wherein said data analysing step of analysing the data of the multi-layer database includes the substep of finding the endpoints of each linear feature to be extracted.

7. (Currently amended) A The method for the extraction of linear features as recited in claim 6, further comprising the step of storing the endpoints found in a database which is used in the output image generating said step of generating the output image.

8. (Currently amended) A The method for the extraction of linear features as recited in claim 1, further comprising the step of providing the a minimum and a maximum length of the lines linear features to be detected.

9. (Currently amended) A system for the extraction of linear features from a digital image and for generating a corresponding output image, comprising:

    a controller provided with an input designed to receive a digital image and an output designed to provide a corresponding output image; said controller containing a multi-layer database; said controller being so configured as to:

        initialize the a discrete parameter domain;

        successively apply a Radon transform on each position in the parameter domain;

        for each position in the parameter domain:

find the coordinates of the a nearest pixel in the digital image; determine the a numerical value of the found nearest pixel; and populate the layers of the provided multi-layer database in accordance with the determined numerical value of the found nearest pixel; analyse the data of the multi-layer database to detect linear features; and

generate an output image by restoring the lines detected linear features in the analysing step;

wherein the multi-layer database includes at least five layers: a first layer used to contain coordinates of zero value pixels; a second layer used to contain coordinates of non-zero value pixels; a third layer used to contain values of the non-zero value pixels; a fourth layer used to contain values of the zero value pixels, and a fifth layer used to contain an accumulation of the non-zero pixel values.

10. (Withdrawn) A system for the extraction of linear features as recited in claim 9, wherein the multi-layer database includes at least three layers; a first layer used to contain the coordinates of the zero value pixels; a second layer used to contain the coordinates of the non-zero value pixels and a third layer used to contain the values of the non-zero value pixels.

11. (Withdrawn) A system for the extraction of linear features as recited in claim 10, wherein, when populating the database, the controller is so configured as to:

store the coordinates of the found pixel in the first layer when the numerical value of the pixel is found to be zero;

store the coordinates of the found pixel in the second layer when the numerical value of the pixel is found to be non-zero;

store the numerical value of the non-zero pixels in the third layer.

12. (Withdrawn) A system for the extraction of linear features as recited in claim 9, wherein the multi-layer database includes at least five layers; a first layer used to contain the coordinates of the zero value pixels; a second layer

~~used to contain the coordinates of the non-zero value pixels; a third layer used to contain the values of the non-zero value pixels; a fourth layer used to contain the values of the zero value pixels and a fifth layer used to contain the accumulation of the non-zero pixel values.~~

13. (Currently amended) A The system for the extraction of linear features as recited in claim 9 ~~12~~, wherein, when populating the layers of the multi-layer database, the controller is so configured as to:

store the coordinates of the found nearest pixel in the first layer when the numerical value of the nearest pixel is found to be below a predetermined threshold;

store the coordinates of the found nearest pixel in the second layer when the numerical value of the nearest pixel is found to be above the predetermined threshold;

store the a numerical value of the pixels having a value which is above the predetermined threshold in the third layer;

store the a numerical value of the pixels having a value which is below the predetermined threshold in the fourth layer; and

store the an accumulation of the numerical value of the pixels that have a numerical value which is above the predetermined threshold in the fifth layer.

14. (Currently amended) A The system for the extraction of linear features as recited in claim 9<sub>1</sub>, further comprising an output device connected to said output of said controller to receive the output image generated by said controller.

15. (Currently amended) A The system for the extraction of linear features as recited in claim 9<sub>1</sub>, further comprising an input device connected to said input of said controller to supply the digital image to the controller.